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NOTICES FROM THE LICK OBSERVATORY.*

Prepared by Members of the Staff.

A List of Six Stars Whose Velocities in the Line of Sight are Variable.†

The following six spectroscopic binaries, discovered with the Mills spectrograph, are additional to the thirty-two binaries already announced:—

ϕ *Persei* ($\alpha = 1^{h}\,37^{m}$; $\delta = +\,50^{\circ}\,11'$).

The variable velocity of this star was discovered from the second plate. The observations are:—

Date.	Velocity.	Measured by
1898, September 5	$-\,2^{\mathrm{km}}$	Reese.
1900, December 16	$+24$	Reese.
"	$+23$	Campbell.
1901, October 15	-10	Reese.
November 11	-12	Reese.

This star has bright hydrogen lines, its bright $H\beta$ having been discovered by Espin (*Astr. Nach.*, No. 2963). The $H\gamma$ line may perhaps be best described as a comparatively narrow absorption line with very bright borders. The measures refer to the middle of the dark line. No other lines are apparent in the $H\gamma$ region.

η *Geminorum* ($\alpha = 6^{h}\,09^{m}$; $\delta = +\,22^{\circ}\,32'$).

The observations of this star thus far secured are as follows, the variable velocity having been discovered from the third plate:—

Date.	Velocity.	Measured by
1900, January 15	$+15.8^{\mathrm{km}}$	Reese.
"	$+14$	Stebbins.
January 21	$+15.0$	Reese.

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* Lick Astronomical Department of the University of California.

† From Lick Observatory Bulletin No. 20.

Date.	Velocity.	Measured by
1901, October 13	+22.1	REESE.
November 6	+20.3	REESE.
December 4	+22.8	REESE.
1902, February 2	+25	REESE.
“	+23	STEBBINS.

γ *Canis Minoris* ($\alpha = 7^h\ 23^m$; $\delta = +9°\ 08'$).

The observations of this star are:—

Date.	Velocity.	Measured by
1900, October 29	+44^{km}	REESE.
“	+44	STEBBINS.
1901, November 6	+41	REESE.
“	+40	STEBBINS.
December 22	+54	REESE.
“	+53	STEBBINS.
December 30	+50	REESE.

The fourth plate is underexposed.

ζ *Herculis* ($\alpha = 16^h\ 38^m$; $\delta = +31°\ 47'$).

Early observations of the radial velocity of this star were obtained by BELOPOLSKY at Pulkowa, CAMPBELL at Mount Hamilton, and NEWALL at Cambridge, as follows:—

Date.	Velocity.	Measured by
1893, May 18	—68^{km}	BELOPOLSKY.
May 22	—84	BELOPOLSKY.
June 2	—75	BELOPOLSKY.
June 3	—67	BELOPOLSKY.
June 4	—66	BELOPOLSKY.
June 14	—64	BELOPOLSKY.
June 16	—69	BELOPOLSKY.
Mean	—70.4	
1897, April 29	—69.1	CAMPBELL.
1898, May 11	—70.4	CAMPBELL.
May 23	—70.0	CAMPBELL.
August 19	—70.9	CAMPBELL.
Mean	—70.1	
1897, June 14	—71.4	NEWALL.
1898, May 16	—68.4	NEWALL.
1899, April 29	—74.3	NEWALL.
Mean	—71.4	

The above observations afforded no evidence whatever of variable velocity.

Recent observations at the Lick Observatory are as follows:—

Date.		Velocity.	Measured by
1901, July	1	-74^{km}	Wright.
“		-73.9	Reese.
August	6	-75.8	Reese.
1902, April	13	-74.2	Reese.
Mean		-74.6	

The velocity has therefore changed about 4^{km} since 1898.

This star is a well-known visual binary, period about 33 years.

α *Equulei* ($\alpha = 21^{\mathrm{h}}\ 11^{\mathrm{m}}$; $\delta = +4^\circ\ 50'$).

The variable velocity of this star was detected from the third of the following observations:—

Date.		Velocity.	Measured by
1900, June	25	-26^{km}	Wright.
July	18	-22	Wright.
1901, June	25	-2	Wright.
September	1	-14	Wright.
October	15	-12	Reese.
1902, June	2	-26	Stebbins.

This star has a composite spectrum, discovered by Miss Maury, of Harvard College Observatory.

o *Andromedæ* ($\alpha = 22^{\mathrm{h}}\ 57^{\mathrm{m}}$; $\delta = +41^\circ\ 47'$).

The following observations of this star have been secured:—

Date.		Velocity.	Measured by
1900, October	9	-11^{km}	Wright.
December	17	-15	Campbell.
“	17	-17	Wright.
1901, June	25	-20	Wright.
August	12	-12	Reese.

These measures depend entirely upon the excellent $H\gamma$ line.

This star has a composite spectrum, discovered likewise by Miss Maury.

Before the discovery of the thirty-eight spectroscopic binaries with the Mills spectrograph, three had been discovered in the same list of stars by Belopolsky, making forty-one binaries in about 350 stars observed. The proportion is therefore one binary star for every eight observed, not taking into account a considerable list of suspected cases awaiting confirmation. The variable velocity of our Sun, due to its revolving planets, has a double amplitude of only a few hundredths of a kilometer. As the work progresses, and the degree of accuracy attainable increases, we shall probably find that there is a regular gradation of double amplitudes from that of the Sun up to those of the spectroscopic binaries already discovered, and it is possible that the star which is not a spectroscopic binary will prove to be the rare exception.

Acknowledgements are due to Messrs. WRIGHT and REESE for continued efficient assistance in the line of sight work.

July 1, 1902. W. W. CAMPBELL.

GIFT TO THE LICK ORSERVATORY.

Mr. D. O. MILLS has again shown his interest in astronomical work by providing the sum of one thousand dollars to defray the expenses of reconstructing the Mills spectrograph. Dr. REESE has designed the new mounting. It will be constructed as far as possible of steel, and will include improvements suggested by our six years' experience with the Mills spectrograph.

W. W. CAMPBELL.

January, 1902.

GIFT TO THE LICK OBSERVATORY.

The thoughtful generosity of Mrs. PHŒBE A. HEARST, Regent of the University of California, has increased the available resources of the Lick Observatory for the calendar year 1902 to the extent of twenty-five hundred dollars. This sum is to be devoted to equipment purposes, and the efficiency of several of our departments will be greatly increased thereby.

June 12, 1902. W. W. CAMPBELL.

ANNOUNCEMENT CONCERNING ASTRONOMICAL PHOTOGRAPHS.

There has been a great demand in the past two years from institutions, investigators and teachers for copies of the Lick Observatory photographs of astronomical subjects. The unusual pressure of observational duties and the smallness of the staff has prevented compliance with these legitimate demands.

This is to announce that the Observatory is now prepared to supply lantern slides, transparencies, prints, etc., of any negatives in its collection, at moderate expense. It is assumed that